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10/028,978	12/28/2001	Tetsuya Kondo	21994/00036	3742

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EXAMINER	
BATTAGLIA, MICHAEL V	
ART UNIT	**PAPER NUMBER**
2652	

DATE MAILED: 06/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/028,978	KONDO ET AL.	
	Examiner	Art Unit	
	Michael V. Battaglia	2652	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 April 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *28 December 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on April 8, 2005 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-4 and 6 are rejected under 35 U.S.C. 103(a) as obvious over Ohgo (US 6,269,072) in view of Takeda et al (hereafter Takeda) (US 6,512,735) and further in view of Ko et al (hereafter Ko) (US 6,813,230).

In regard to claim 1, Ohgo discloses an information recording medium comprising: a substrate (Fig. 1, element 2) having a microscopic pattern, having a continuous shape of approximately parallel grooves formed with alternating groove and land sections (Col. 16, lines 17-19); a recording layer formed on the microscopic pattern (Col. 16, lines 24-26); and a light transmission layer (Fig. 1, element 6) formed on the recording layer, wherein the microscopic pattern is formed so as to satisfy a relation of $P < \lambda/NA$ (Col. 16, lines 19-20 and 37-39), wherein P is a pitch of the groove section or the land section, λ is a wavelength of reproducing light beam and

NA is a numerical aperture of an objective lens. It is noted that Ohgo discloses the thickness of the light transmission layer to be 0.1 mm and within a range of 0.07 to 0. 12 mm (Col. 10, line 41; Col. 12, lines 34-35; and Col. 13, lines 41-42) and that Ohgo does not disclose any thickness of the light transmission layer (Fig. 1, element 6) other than 0.1mm. However, Ohgo does not specifically disclose the thickness of the light transmission layer used in Embodiment 9, which is the embodiment used in the present rejection. Ohgo also does not disclose that the land section is wobbled in the radial direction by a superimposed wave obtained by superimposing a single frequency wave having a frequency of integral multiples or one over integral multiples of a frequency of a phase modulated wave on the phase modulated wave.

Takeda teaches that by using a light transmission layer (Fig. 1, element 5) with a thickness of 0.1 mm and within a range of 0.07 to 0. 12 mm, it is possible to use an objective lens having a high numerical aperture with the information recording medium, reduce the laser spot size, and have an increased recording density (Col. 4, lines 10-29).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to make the thickness of the light transmission layer in the information recording medium of Ohgo be within a range of 0.07 to 0.12 mm as suggested by Takeda, the motivation being to have a thickness of the light transmission layer of Ohgo that works with the high numerical aperture of Ohgo and to, as a result, have increased recording density.

Ko discloses wobbling a land section (Fig. 6, Land Track) in the radial direction by a superimposed wave obtained by superimposing a single frequency wave ("carrier" or "wobble clock signal" of Col. 7, lines 3-7) having a frequency (Col. 7, lines 36-39) of integral multiples or one over integral multiples of a frequency of a phase modulated wave ("phase-modulated push-pull signal" of Col. 7, lines 4-5 from which the "address information" of Col. 7, line 36 and Col. 11,

lines 2-3 (also called "address data" in Col. 7, line 7) is detected) on the phase modulated wave (Fig. 11 and Col. 10, line 59-Col. 11, line 45 (note that both the wobble clock signal and the address signal is produced using the phase modulated push-pull signal)). Ko teaches that doing so allows more data to be recorded in a recording medium (Abstract, particularly lines 15-18).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to wobble the land section in the information recording medium of Ohgo in the radial direction by a superimposed wave obtained by superimposing a single frequency wave having a frequency of integral multiples or one over integral multiples of a frequency of a phase modulated wave on the phase modulated wave as suggested by Ko, the motivation being to allow more data to be recorded in the information recording medium.

In regard to claim 2, Ohgo discloses that a record based on at least one of reflectivity difference and phase difference is performed onto either one of the groove and land sections (Col. 3, lines 66-67 and Col. 9, lines 25-30).

In regard to claim 3, Ohgo discloses that the wavelength λ is within a range of 350 to 450 nm (Col. 16, lines 38-39) and the numerical aperture NA is within a range of 0.75 to 0.9 (Col. 16, line 37).

In regard to claim 4, Ohgo discloses that recording in accordance with at least one of the reflectivity difference and the phase difference is performed (Col. 9, lines 25-30). Ohgo does not disclose that the recording is performed so that the modulated amplitude exceeds 0.4.

Applicant defines a modulated amplitude as a mathematical relationship in the form of a ratio (Page 62, lines 15-19). Examiner concludes that this mathematical relationship is known. Examiner interprets the specification (JIS Standard X6241: 1997) as establishing a range of values

for the terms of the mathematical relationship (I14H and I14L), hence establishing a range of modulated amplitudes.

In keeping with In re Peterson (65 USPQ2D 1379), it would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the range of modulated amplitudes, the motivation being the inherent improvement of the optimization. Applicant's cooperation is respectfully requested in completing the search report by providing the Office with JIS Standard X6241: 1997.

In regard to claim 6, Ohgo discloses that the recording layer is formed by a phase change material (Col. 16, lines 24-26).

3. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ohgo in view of Takeda and further in view of Ko as applied to claim 2 above, and further in view of Misawa et al (hereafter Misawa) (US 5,948,593).

Ohgo discloses that recording in accordance with at least one of the reflectivity difference and the phase difference is performed (Col. 9, lines 25-30). Ohgo does not disclose that the recording is performed so that the modulated amplitude exceeds 0.4.

Misawa discloses a modulated amplitude of 0.65 that is more than 0.4 and teaches that this value is good (Col. 54, lines 5-6).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to perform recording on the information recording medium of Ohgo so that the modulated amplitude exceeds 0.4 as suggested by Misawa, the motivation being to perform recording with a modulated amplitude value that is good.

4. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ohgo in view of Takeda and further in view of Ko as applied to claim 2 above, and further in view of Watanabe et al (hereafter Watanabe) (US 4,651,172).

Ohgo discloses that recording in accordance with at least one of the reflectivity difference and the phase difference is performed (Col. 9, lines 25-30). Ohgo does not disclose that the recording is performed so that the reflectivity exceeds 5%.

Watanabe teaches that when recording is performed with a reflectivity of less than 5%, the intensity of reflected light becomes lower and the signal/noise ratio of the reproduced signal deteriorates (Col. 2, lines 61-67).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to perform recording on the information recording medium of Ohgo so that the reflectivity exceeds 5% as suggested by Watanabe, the motivation being for the intensity of reflected light to be high enough that the signal/noise ratio of the reproduced signal does not deteriorate.

5. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ohgo in view of Takeda and further in view of Ko and further in view of Yamamoto et al (hereafter Yamamoto) (US 6,721,259).

Ohgo discloses an information recording medium at least comprising: a substrate (Fig. 1, element 2) having a microscopic pattern, having a continuous shape of approximately parallel grooves formed with a alternating groove land sections (Col. 16, lines 17-19); a recording layer formed on the microscopic pattern (Col. 16, lines 24-26); and a light transmission layer (Fig. 1, element 6) formed on the recording layer; wherein the microscopic pattern is formed so as to

satisfy a relation of $P < \lambda/NA$ (Col. 16, lines 19-20 and 37-39), wherein P is a pitch of the groove section or the land section, λ is a wavelength of reproducing light beam and NA is a numerical aperture of an objective lens. It is noted that Ohgo discloses the thickness of the light transmission layer to be 0.1 mm and within a range of 0.07 to 0. 12 mm (Col. 10, line 41; Col. 12, lines 34-35; and Col. 13, lines 41-42) and that Ohgo does not disclose any thickness of the light transmission layer (Fig. 1, element 6) other than 0.1mm. However, Ohgo does not specifically disclose the thickness of the light transmission layer used in Embodiment 9, which is the embodiment used in the present rejection. Ohgo also does not disclose that the land section is wobbled in the radial direction by a superimposed wave obtained by superimposing a single frequency wave having a frequency of integral multiples or one over integral multiples of a frequency of a phase modulated wave on the phase modulated wave.

Takeda teaches that by using a light transmission layer (Fig. 1, element 5) with a thickness of 0.1 mm and within a range of 0.07 to 0. 12 mm, it is possible to use an objective lens having a high numerical aperture with the information recording medium, reduce the laser spot size, and have an increased recording density (Col. 4, lines 10-29).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to make the thickness of the light transmission layer in the information recording medium of Ohgo be within a range of 0.07 to 0.12 mm as suggested by Takeda, the motivation being to have a thickness of the light transmission layer of Ohgo that works with the high numerical aperture of Ohgo and to, as a result, have increased recording density. Ohgo in view of Takeda does not disclose a reproducing apparatus for reproducing from the information

recording medium. It is noted that the information recording medium of Ohgo is supported on a turntable (Fig. 1, element 4) while rotating.

Ko discloses wobbling a land section (Fig. 6, Land Track) in the radial direction by a superimposed wave obtained by superimposing a single frequency wave ("carrier" or "wobble clock signal" of Col. 7, lines 3-7) having a frequency (Col. 7, lines 36-39) of integral multiples or one over integral multiples of a frequency of a phase modulated wave ("phase-modulated push-pull signal" of Col. 7, lines 4-5 from which the "address information" of Col. 7, line 36 and Col. 11, lines 2-3 (also called "address data" in Col. 7, line 7) is detected) on the phase modulated wave (Fig. 11 and Col. 10, line 59-Col. 11, line 45 (note that both the wobble clock signal and the address signal is produced using the phase modulated push-pull signal)). Ko teaches that doing so allows more data to be recorded in a recording medium (Abstract, particularly lines 15-18).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to wobble the land section in the information recording medium of Ohgo in the radial direction by a superimposed wave obtained by superimposing a single frequency wave having a frequency of integral multiples or one over integral multiples of a frequency of a phase modulated wave on the phase modulated wave as suggested by Ko, the motivation being to allow more data to be recorded in the information recording medium.

Yamamoto discloses a reproducing apparatus for reproducing an information recording medium, the reproducing apparatus comprising: a pickup (Figs. 10 and 11, element 10) composed of a light emitting element (Col. 14, lines 45-46) having a wavelength of λ within a range of 350 to 450 nm (Col. 22, lines 22-23) and an objective lens (Fig. 10, element 20) having a numerical aperture of NA within a range of 0.75 to 0.9 (Cols. 19-20, Table 4 and Col. 3, lines 1-3) for reading

out reflected light from the information recording medium; a motor (Fig. 11, element 31) for rotating the information recording medium; servo means (Fig. 11, element 32) for controlling the drive of the pickup and the motor; a turntable (inherent because the information recording medium must be supported while rotating) for supporting the information recording medium while rotating; demodulator means (Fig. 11, element 33) for demodulating an information signal read out by the pickup; interface (I/F) means (Fig. 11, element 33) for transmitting a signal demodulated by the demodulator externally; and controlling means (Fig. 11, element 35) for controlling the reproducing apparatus totally (Col. 16, lines 48-49).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to reproduce from the information recording medium of Ohgo in view of Takeda and further in view of Ko using the reproducing apparatus of Yamamoto, the motivation being to reproduce information recorded on the information recording medium.

6. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ohgo in view of Takeda and further in view of Ko and further in view of Yamamoto as applied to claim 7 above, and further in view of Tsukihashi (US 6,496,458).

Ohgo in view of Takeda and further in view of Ko and further in view of Yamamoto as applied to claim 7 does not disclose that the reproducing apparatus further comprises an auxiliary information demodulator for demodulating a differential signal outputted from the pickup.

Tsukihashi discloses an auxiliary information demodulator (Fig. 1, element 18) for demodulating a differential signal outputted from the pickup (Col. 3, lines 27-33). It is noted that the push-pull signal output from the pickup (Fig. 1, elements 1 and 2) is a differential signal.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate into the reproducing apparatus of Ohgo in view of Takeda and

further in view of Ko and further in view of Yamamoto the auxiliary information demodulator of Tsukihashi, the motivation being to take advantage of auxiliary information stored on a disc and to make the reproducing apparatus of Ohgo in view of Takeda and further in view of Ko and further in view of Yamamoto compatible with information recording mediums that have wobble signals recorded thereon.

7. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ohgo in view of Takeda and further in view of Ko in further view of Yamamoto and in further view of Tsukihashi.

Ohgo discloses an information recording medium comprising: a substrate (Fig. 1, element 2) having a microscopic pattern, having a continuous shape of approximately parallel grooves formed with alternating groove and land sections (Col. 16, lines 17-19); a recording layer formed on the microscopic pattern (Col. 16, lines 24-26); and a light transmission layer (Fig. 1, element 6) formed on the recording layer; wherein the microscopic pattern is formed so as to satisfy a relation of $P < \lambda/NA$ (Col. 16, lines 19-20 and 37-39), wherein P is a pitch of the groove section or the land section, λ is a wavelength of reproducing light beam and NA is a numerical aperture of an objective lens. It is noted that Ohgo discloses the thickness of the light transmission layer to be 0.1 mm and within a range of 0.07 to 0. 12 mm (Col. 10, line 41; Col. 12, lines 34-35; and Col. 13, lines 41-42) and that Ohgo does not disclose any thickness of the light transmission layer (Fig. 1, element 6) other than 0.1mm. However, Ohgo does not specifically disclose the thickness of the light transmission layer used in Embodiment 9, which is the embodiment used in the present rejection. Ohgo also does not disclose that the land section is wobbled in the radial direction by a superimposed wave obtained by superimposing a single frequency wave having a frequency of

integral multiples or one over integral multiples of a frequency of a phase modulated wave on the phase modulated wave.

Takeda teaches that by using a light transmission layer (Fig. 1, element 5) with a thickness of 0.1 mm and within a range of 0.07 to 0. 12 mm, it is possible to use an objective lens having a high numerical aperture with the information recording medium, reduce the laser spot size, and have an increased recording density (Col. 4, lines 10-29).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to make the thickness of the light transmission layer in the information recording medium of Ohgo be within a range of 0.07 to 0.12 mm as suggested by Takeda, the motivation being to have a thickness of the light transmission layer of Ohgo that works with the high numerical aperture of Ohgo and, as a result, to have increased recording density. Ohgo in view of Takeda do not disclose a recording apparatus for recording an original information signal on the information recording medium. It is noted that the information recording medium is supported on a turntable (Fig. 1, element 4) while rotating.

Ko discloses wobbling a land section (Fig. 6, Land Track) in the radial direction by a superimposed wave obtained by superimposing a single frequency wave ("carrier" or "wobble clock signal" of Col. 7, lines 3-7) having a frequency (Col. 7, lines 36-39) of integral multiples or one over integral multiples of a frequency of a phase modulated wave ("phase-modulated push-pull signal" of Col. 7, lines 4-5 from which the "address information" of Col. 7, line 36 and Col. 11, lines 2-3 (also called "address data" in Col. 7, line 7) is detected) on the phase modulated wave (Fig. 11 and Col. 10, line 59-Col. 11, line 45 (note that both the wobble clock signal and the address signal is produced using the phase modulated push-pull signal)). Ko teaches that doing so allows more data to be recorded in a recording medium (Abstract, particularly lines 15-18).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to wobble the land section in the information recording medium of Ohgo in the radial direction by a superimposed wave obtained by superimposing a single frequency wave having a frequency of integral multiples or one over integral multiples of a frequency of a phase modulated wave on the phase modulated wave as suggested by Ko, the motivation being to allow more data to be recorded in the information recording medium.

Yamamoto discloses a recording apparatus for recording an original information signal on an information recoding medium; the recording apparatus comprising: a pickup (Figs. 10 and 11, element 10) composed of a light emitting element (Col. 14, lines 45-46) having a wavelength of λ within a range of 350 to 450 nm (Col. 22, lines 22-23) and an objective lens (Fig. 10, element 20) having a numerical aperture of NA within a range of 0.75 to 0.9 (Cols. 19-20, Table 4 and Col. 3, lines 1-3) for reading out reflected light from and recording on the information recording medium; a motor (Fig. 11, element 31) for rotating the information recording medium; servo means for controlling to drive the pickup and the motor; a turntable (inherent because the information recording medium must be supported while rotating) for supporting the information recording medium while rotating; interface (I/F) means (Fig. 11, element 33) for receiving the original information signal to be recorded; modulator means (Fig. 11, element 33) for modulating the original information signal; waveform converter (Fig. 11, element 33) means for converting the original information signal into a format suitable for a recording characteristic of the recording layer of the information recording medium (Col. 16, line 67-Col. 17, line 3); and controlling means (Fig. 11, element 35) for controlling the entire recording apparatus (Col. 16, lines 48-49).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to record an original information signal on the information recording medium of Ohgo in view of Takeda and further in view of Ko using the recording apparatus of Yamamoto, the motivation being to record original information on the information recording medium. Ohgo in view of Takeda and further in view of Ko and further in view of Yamamoto does not disclose that the recording apparatus comprises an auxiliary information demodulator means for demodulating a differential signal outputted from the pickup.

Tsukihashi discloses an auxiliary information demodulator (Fig. 1, element 18) for demodulating a differential signal outputted from the pickup (Col. 3, lines 27-33). It is noted that the push-pull signal output from the pickup (Fig. 1, elements 1 and 2) is a differential signal. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate into the recording apparatus of Ohgo in view of Takeda and further in view of Ko and further in view of Yamamoto the auxiliary information demodulator of Tsukihashi, the motivation being to take advantage of auxiliary information stored on a disc and to make the recording apparatus of Ohgo in view of Takeda and further in view of Ko and further in view of Yamamoto compatible with information recording mediums that have wobble signals recorded thereon.

8. Claims 10-13 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohgo (US 6,269,072) in view of Takeda et al (hereafter Takeda) (US 6,512,735) and further in view of Tanase et al (hereafter Tanase) (US 6,240,056) and further in view of Abe et al (hereafter Abe) (US 6,381,208).

In regard to claim 10, Ohgo discloses an information recording medium comprising: a substrate (Fig. 1, element 2) having a microscopic pattern, having a continuous shape of

approximately parallel grooves formed with alternating groove and land sections (Col. 16, lines 17-19); a recording layer formed on the microscopic pattern (Col. 16, lines 24-26); and a light transmission layer (Fig. 1, element 6) formed on the recording layer, wherein the microscopic pattern is formed so as to satisfy a relation of $P < \lambda/NA$ (Col. 16, lines 19-20 and 37-39), wherein P is a pitch of the groove section or the land section, λ is a wavelength of reproducing light beam and NA is a numerical aperture of an objective lens. It is noted that Ohgo discloses the thickness of the light transmission layer to be 0.1 mm and within a range of 0.07 to 0.12 mm (Col. 10, line 41; Col. 12, lines 34-35; and Col. 13, lines 41-42) and that Ohgo does not disclose any thickness of the light transmission layer (Fig. 1, element 6) other than 0.1mm. However, Ohgo does not specifically disclose the thickness of the light transmission layer used in Embodiment 9, which is the embodiment used in the present rejection. It is also noted that the light transmission layer of Ohgo inherently has scattering within a range over the entire transmission layer. Ohgo does not disclose that scattering of the thickness of the light transmission layer is within a range of ± 0.002 mm over the entire transmission layer.

Takeda teaches that by using a light transmission layer (Fig. 1, element 5) with a thickness of 0.1 mm and within a range of 0.07 to 0. 12 mm, it is possible to use an objective lens having a high numerical aperture with the information recording medium, reduce the laser spot size, and have an increased recording density (Col. 4, lines 10-29).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to make the thickness of the light transmission layer in the information recording medium of Ohgo be within a range of 0.07 to 0.12 mm as suggested by Takeda, the

motivation being to have a thickness of the light transmission layer of Ohgo that works with the high numerical aperture of Ohgo and to, as a result, have increased recording density.

Tanase discloses a light transmission layer (Fig. 4, element 62) formed over a recording layer (Fig. 4, element 63) wherein scattering of the thickness of the light transmission layer is within a range of ±0.002 mm over the entire transmission layer (Col. 7, lines 31-32). It is noted that the protection layer of Tanase (Fig. 4, element 62) is a light transmission layer because light must be transmitted through the protection layer to reach the recording layer (Fig. 4, element 63) (note position of reflecting layer (Fig. 4, element 65) in relation to the protection and recording layers in Fig. 4). Because the tolerable error of thickness of the light transmission layer is ±0.00001 mm, the scattering of the thickness of the light transmission layer is within the range of thickness of ±0.00001 mm, which is well within the range of ±0.002 mm.

Abe discloses that scattering of the thickness of a light transmission layer results in increased spherical aberration making correct recording to and reproducing from the recording medium impossible (Col. 2, lines 24-29).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to make the scattering of the thickness of the light transmission layer of Ohgo within a range of ±0.002 mm over the entire transmission layer as suggested by Tanase, the motivation being to reduce the amount of spherical aberration caused by the scattering of the thickness of a light transmission layer to a tolerable level and make recording to and reproducing from the recording medium possible as taught by Abe.

In regard to claim 11, Ohgo discloses that a record based on at least one of reflectivity difference and phase difference is performed onto either one of the groove and land sections (Col. 3, lines 66-67 and Col. 9, lines 25-30).

In regard to claim 12, Ohgo discloses that the wavelength λ is within a range of 350 to 450 nm (Col. 16, lines 38-39) and the numerical aperture NA is within a range of 0.75 to 0.9 (Col. 16, line 37).

In regard to claim 13, Ohgo discloses that recording in accordance with at least one of the reflectivity difference and the phase difference is performed (Col. 9, lines 25-30). Ohgo does not disclose that the recording is performed so that the modulated amplitude exceeds 0.4.

Applicant defines a modulated amplitude as a mathematical relationship in the form of a ratio (Page 62, lines 15-19). Examiner concludes that this mathematical relationship is known. Examiner interprets the specification (JIS Standard X6241: 1997) as establishing a range of values for the terms of the mathematical relationship (I14H and I14L), hence establishing a range of modulated amplitudes.

In keeping with In re Peterson (65 USPQ2D 1379), it would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the range of modulated amplitudes, the motivation being the inherent improvement of the optimization. Applicant's cooperation is respectfully requested in completing the search report by providing the Office with JIS Standard X6241: 1997.

In regard to claim 15, Ohgo discloses that the recording layer is formed by a phase change material (Col. 16, lines 24-26).

9. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ohgo in view of Takeda and further in view of Tanase and further in view of Abe as applied to claim 11 above, and further in view of Misawa et al (hereafter Misawa) (US 5,948,593).

Ohgo discloses that recording in accordance with at least one of the reflectivity difference and the phase difference is performed (Col. 9, lines 25-30). Ohgo does not disclose that the recording is performed so that the modulated amplitude exceeds 0.4.

Misawa discloses a modulated amplitude of 0.65 that is more than 0.4 and teaches that this value is good (Col. 54, lines 5-6).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to perform recording on the information recording medium of Ohgo so that the modulated amplitude exceeds 0.4 as suggested by Misawa, the motivation being to perform recording with a modulated amplitude value that is good.

10. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ohgo in view of Takeda and further in view of Tanase and further in view of Abe as applied to claim 11 above, and further in view of Watanabe et al (hereafter Watanabe) (US 4,651,172).

Ohgo discloses that recording in accordance with at least one of the reflectivity difference and the phase difference is performed (Col. 9, lines 25-30). Ohgo does not disclose that the recording is performed so that the reflectivity exceeds 5%.

Watanabe teaches that when recording is performed with a reflectivity of less than 5%, the intensity of reflected light becomes lower and the signal/noise ratio of the reproduced signal deteriorates (Col. 2, lines 61-67).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to perform recording on the information recording medium of Ohgo so that

the reflectivity exceeds 5% as suggested by Watanabe, the motivation being for the intensity of reflected light to be high enough that the signal/noise ratio of the reproduced signal does not deteriorate.

11. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ohgo in view of Takeda and further in view of Yamamoto.

Ohgo discloses an information recording medium comprising: a substrate (Fig. 1, element 2) having a microscopic pattern, having a continuous shape of approximately parallel grooves formed with a alternating groove land sections (Col. 16, lines 17-19); a recording layer formed on the microscopic pattern (Col. 16, lines 24-26); and a light transmission layer (Fig. 1, element 6) formed on the recording layer; wherein the microscopic pattern is formed so as to satisfy a relation of $P < \lambda/NA$ (Col. 16, lines 19-20 and 37-39), wherein P is a pitch of the groove section or the land section, λ is a wavelength of reproducing light beam and NA is a numerical aperture of an objective lens. It is noted that Ohgo discloses the thickness of the light transmission layer to be 0.1 mm and within a range of 0.07 to 0. 12 mm (Col. 10, line 41; Col. 12, lines 34-35; and Col. 13, lines 41-42) and that Ohgo does not disclose any thickness of the light transmission layer (Fig. 1, element 6) other than 0.1mm. However, Ohgo does not specifically disclose the thickness of the light transmission layer used in Embodiment 9, which is the embodiment used in the present rejection.

Takeda teaches that by using a light transmission layer (Fig. 1, element 5) with a thickness of 0.1 mm and within a range of 0.07 to 0. 12 mm, it is possible to use an objective lens having a high numerical aperture with the information recording medium, reduce the laser spot size, and have an increased recording density (Col. 4, lines 10-29).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to make the thickness of the light transmission layer in the information recording medium of Ohgo be within a range of 0.07 to 0.12 mm as suggested by Takeda, the motivation being to have a thickness of the light transmission layer of Ohgo that works with the high numerical aperture of Ohgo and to, as a result, have increased recording density. Ohgo in view of Takeda does not disclose a reproducing apparatus for reproducing from the information recording medium. It is noted that the information recording medium of Ohgo is supported on a turntable (Fig. 1, element 4) while rotating.

Yamamoto discloses a reproducing apparatus for reproducing an information recording medium, the reproducing apparatus comprising: a pickup (Figs. 10 and 11, element 10) composed of a light emitting element (Col. 14, lines 45-46) having a wavelength of λ within a range of 350 to 450 nm (Col. 22, lines 22-23) and an objective lens (Fig. 10, element 20) having a numerical aperture of NA within a range of 0.75 to 0.9 (Cols. 19-20, Table 4 and Col. 3, lines 1-3) for reading out reflected light from the information recording medium; a motor (Fig. 11, element 31) for rotating the information recording medium; servo means (Fig. 11, element 32) for controlling driving of the pickup and the motor; a turntable (inherent because the information recording medium must be supported while rotating) for supporting the information recording medium while rotating; demodulator means (Fig. 11, element 33) for demodulating an information signal read out by the pickup; interface (I/F) means (Fig. 11, element 33) for transmitting a signal demodulated by the demodulator externally; and controlling means (Fig. 11, element 35) for controlling the reproducing apparatus totally (Col. 16, lines 48-49).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to reproduce from the information recording medium of Ohgo in view of Takeda using the reproducing apparatus of Yamamoto, the motivation being to reproduce information recorded on the information recording medium.

12. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ohgo in view of Takeda and further in view of Yamamoto as applied to claim 16 above, and further in view of Tsukihashi (US 6,496,458).

Ohgo in view of Takeda and further in view of Yamamoto as applied to claim 16 does not disclose that the reproducing apparatus further comprises an auxiliary information demodulator for demodulating a differential signal outputted from the pickup.

Tsukihashi discloses an auxiliary information demodulator (Fig. 1, element 18) for demodulating a differential signal outputted from the pickup (Col. 3, lines 27-33). It is noted that the push-pull signal output from the pickup (Fig. 1, elements 1 and 2) is a differential signal.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate into the reproducing apparatus of Ohgo in view of Takeda and further in view of Yamamoto the auxiliary information demodulator of Tsukihashi, the motivation being to take advantage of auxiliary information stored on a disc and to make the reproducing apparatus of Ohgo in view of Takeda and further in view of Yamamoto compatible with information recording mediums that have wobble signals recorded thereon.

13. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ohgo in view of Takeda in further view of Yamamoto and in further view of Tsukihashi.

Ohgo discloses an information recording medium comprising: a substrate (Fig. 1, element 2) having a microscopic pattern, having a continuous shape of approximately parallel grooves

formed with alternating groove and land sections (Col. 16, lines 17-19); a recording layer formed on the microscopic pattern (Col. 16, lines 24-26); and a light transmission layer (Fig. 1, element 6) formed on the recording layer; wherein the microscopic pattern is formed so as to satisfy a relation of $P < \lambda/NA$ (Col. 16, lines 19-20 and 37-39), wherein P is a pitch of the groove section or the land section, λ is a wavelength of reproducing light beam and NA is a numerical aperture of an objective lens. It is noted that Ohgo discloses the thickness of the light transmission layer to be 0.1 mm and within a range of 0.07 to 0. 12 mm (Col. 10, line 41; Col. 12, lines 34-35; and Col. 13, lines 41-42) and that Ohgo does not disclose any thickness of the light transmission layer (Fig. 1, element 6) other than 0.1mm. However, Ohgo does not specifically disclose the thickness of the light transmission layer used in Embodiment 9, which is the embodiment used in the present rejection.

Takeda teaches that by using a light transmission layer (Fig. 1, element 5) with a thickness of 0.1 mm and within a range of 0.07 to 0. 12 mm, it is possible to use an objective lens having a high numerical aperture with the information recording medium, reduce the laser spot size, and have an increased recording density (Col. 4, lines 10-29).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to make the thickness of the light transmission layer in the information recording medium of Ohgo be within a range of 0.07 to 0.12 mm as suggested by Takeda, the motivation being to have a thickness of the light transmission layer of Ohgo that works with the high numerical aperture of Ohgo and, as a result, to have increased recording density. Ohgo in view of Takeda do not disclose a recording apparatus for recording an original information signal

on the information recording medium. It is noted that the information recording medium is supported on a turntable (Fig. 1, element 4) while rotating.

Yamamoto discloses a recording apparatus for recording an original information signal on an information recoding medium; the recording apparatus comprising: a pickup (Figs. 10 and 11, element 10) composed of a light emitting element (Col. 14, lines 45-46) having a wavelength of λ within a range of 350 to 450 nm (Col. 22, lines 22-23) and an objective lens (Fig. 10, element 20) having a numerical aperture of NA within a range of 0.75 to 0.9 (Cols. 19-20, Table 4 and Col. 3, lines 1-3) for reading out reflected light from and recording on the information recording medium; a motor (Fig. 11, element 31) for rotating the information recording medium; servo means for controlling driving of the pickup and the motor; a turntable (inherent because the information recording medium must be supported while rotating) for supporting the information recording medium while rotating; interface (I/F) means (Fig. 11, element 33) for receiving the original information signal to be recorded; modulator means (Fig. 11, element 33) for modulating the original information signal; waveform converter (Fig. 11, element 33) means for converting the original information signal into a format suitable for a recording characteristic of the recording layer of the information recording medium (Col. 16, line 67-Col. 17, line 3); and controlling means (Fig. 11, element 35) for controlling the entire recording apparatus (Col. 16, lines 48-49).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to record an original information signal on the information recording medium of Ohgo in view of Takeda using the recording apparatus of Yamamoto, the motivation being to record original information on the information recording medium. Ohgo in view of Takeda and

further in view of Yamamoto does not disclose that the recording apparatus comprises an auxiliary information demodulator means for demodulating a differential signal outputted from the pickup.

Tsukihashi discloses an auxiliary information demodulator (Fig. 1, element 18) for demodulating a differential signal outputted from the pickup (Col. 3, lines 27-33). It is noted that the push-pull signal output from the pickup (Fig. 1, elements 1 and 2) is a differential signal. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate into the recording apparatus of Ohgo in view of Takeda and further in view of Yamamoto the auxiliary information demodulator of Tsukihashi, the motivation being to take advantage of auxiliary information stored on a disc and to make the recording apparatus of Ohgo in view of Takeda and further in view of Yamamoto compatible with information recording mediums that have wobble signals recorded thereon.

Response to Arguments

14. Applicant's arguments with respect to claims 1-9 have been considered but are moot in view of the new ground(s) of rejection.

15. Applicant's arguments filed April 8, 2005 with respect to claims 10-18 have been fully considered but they are not persuasive. Applicant argues that Ohgo and Takeda fail to disclose that the land section is wobbled in the radial direction by the method of phase modulation which is phase modulating by a superimposed wave obtained by superimposing a single frequency wave having a frequency of integral multiples or one over integral multiples of a frequency of a phase modulated wave on the phase modulated wave. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., the land section is wobbled in the radial direction by the method of

phase modulation) are not recited in claims 10-18. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

16. Applicant's arguments filed April 8, 2005 with respect to claims 10-15 have been fully considered but they are not persuasive. Applicant argues that neither Tanase or Abe disclose that scattering of the light transmittion layer is within the range of ±0.002 mm. However, as noted by Applicant, Tanase discloses a protection layer (Fig. 4, element 62) with a tolerable error in thickness of ±0.00001 mm (Col. 7, lines 31-32). The protection layer is a light transmission layer because light must be transmitted through the protection layer to reach the recording layer (Fig. 4, element 63) (note position of reflecting layer (Fig. 4, element 65) in relation to the protection and recording layers in Fig. 4). Because the tolerable error of thickness of the light transmission layer is ±0.00001 mm, the scattering of the thickness of the light transmission layer is within the range of thickness of ±0.00001 mm, which is well within the range of ±0.002 mm. Abe provides the motivation for the scattering of the thickness of the light transmission layer to be within a tolerable range.

17. Applicant's arguments filed April 8, 2005 with respect to claims 14 and 16-18 have been fully considered but they are not persuasive. Applicant argues that references to Watanabe, Yamamoto, Tsukihashi, and Tanase have limited relevant teachings that fail to create valid obviousness rejections under Section 103 with their respective primary and secondary references. However, it is unclear why the teachings of Watanabe, Yamamoto, Tsukihashi and Tanase which disclose subject matter on which claim limitations read would be limited in relevance and why the obviousness rejections that use them would not be valid.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael V. Battaglia whose telephone number is (571) 272-7568. The examiner can normally be reached on 5-4/9 Plan with 1st Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa T. Nguyen can be reached on (571) 272-7579. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Michael Battaglia

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